Unit 5, Lesson 2

Introduction to Functions

Let's learn what a function is.

2.1 Square Me

Here are some numbers in a list:

1 -3 $-\frac{1}{2}$ 3 2 $\frac{1}{4}$ 0.5

1. How many different numbers are in the list?

2. Make a new list containing the squares of all these numbers.

3. How many different numbers are in the new list?

4. Explain why the two lists do not have the same number of different numbers.

2.2 You Know This, Do You Know That?

Say *yes* or *no* for each question. If yes, draw an input-output diagram. If no, give examples of two different outputs that are possible for the same input.

1. A bookshelf is 5.5 feet tall. Do you know its height in inches?

2. A number is 5. Do you know its square?

3. The square of a number is 16. Do you know the number?

4. A square has a perimeter of 12 cm. Do you know its area?

5. A rectangle has an area of 16 cm^2. Do you know its length?

6. You are given a number. Do you know the number that is $\frac{1}{5}$ as big?

7. You are given a number. Do you know its reciprocal?

2.3 Using Function Language

Here are the questions from the previous activity.

For the ones you said yes to, write a statement like "The height a rubber ball bounces to depends on the height it was dropped from" or "Bounce height is a **function** of drop height."

For all of the ones you said no to, write a statement like "The day of the week does not determine the temperature that day" or "The temperature that day is not a function of the day of the week."

1. A bookshelf is 5.5 feet tall. Do you know its height in inches?

2. A number is 5. Do you know its square?

3. The square of a number is 16. Do you know the number?

4. A square has a perimeter of 12 cm. Do you know its area?

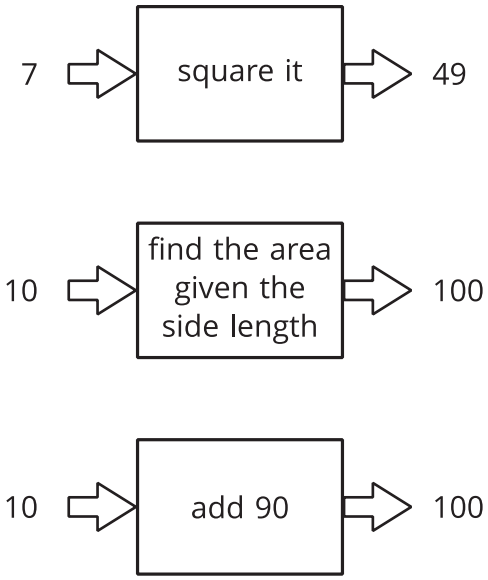
5. A rectangle has an area of 16 cm^2. Do you know its length?

6. You are given a number. Do you know the number that is $\frac{1}{5}$ as big?

7. You are given a number. Do you know its reciprocal?

2.4 Same Function, Different Rule?

Which input-output rules could describe the same function (if any)? Be prepared to explain your reasoning.



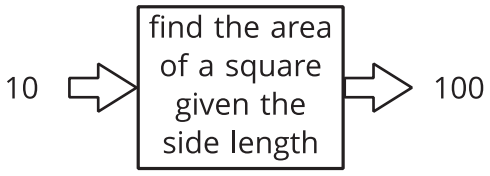
Are you ready for more?

The phrase "is a function of" also gets used in nonmathematical speech in sentences like "The range of foods you like is a function of your upbringing." What is this sentence trying to convey? When the word "function" is used here, does it have the same use as the mathematical word?

Lesson 2 Summary

Let's say we have an input-output rule that gives exactly one output for each allowable input. Then we say the output *depends* on the input, or the output is a **function** of the input.

For example, the area of a square is a function of the side length because the area can be found from the side length by squaring it. So when the input is 10 cm, the output is 100 cm^2.



Sometimes we might have two different rules that describe the same function. As long as we always get the same single output from any given input, the rules describe the same function.

CC BY NC Illustrative Mathematics, based on IM 6–8 Math, CC BY Open Up Resources.